

Europaisches Patentamt
European Patent Office
Office européen des brevets



Publication number:

0 485 616 A1

(2)

# EUROPEAN PATENT APPLICATION published in accordance with Art. 158(3) EPC

21 Application number: 91909703.0

(51) Int. Cl.5: A61K 7/22

2 Date of filing: 23.05.91

International application number:
PCT/JP91/00691

International publication number:
 WO 91/18585 (12.12.91 91/28)

Priority: 29.05.90 JP 139125/90

43 Date of publication of application: 20.05.92 Bulletin 92/21

Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

Applicant: SUNSTAR KABUSHIKI KAISHA
 3-1, Asahi-machi
 Takatsuki-shi Osaka 569(JP)

Inventor: OHTSUKI, Hidehiko, 26-1,
Nishimakami 2-chome
Takatsuki-shi
Osaka 569(JP)
Inventor: FUJITA, Tomomi, 2-1-102,
Kishibenaka 1-chome
Sulta-hi
Osaka 564(JP)

Representative: Vossius & Partner Siebertstrasse 4 P.O. Box 86 07 67 W-8000 München 86(DE)

# (M) ORAL COMPOSITION.

An oral composition comprising cetylpyridinium chloride and a lower alkyl ester of an N°-(long-chain acyl)-substituted basic amino acid or its salt. The composition serves to promote the adsorption of cetylpyridinium chloride on the surfaces of teeth to exhibit an excellent effect in preventing dental plaque and dental caries.

### FIELD OF THE INVENTION

5

10

35

The present invention relates to a composition for the oral cavity. More particularly, it relates to an oral composition wherein adsorption of cetylpyridinium chloride as a bactericide to the surfaces of teeth is

# BACKGROUND OF THE INVENTION

Dental plaque is formed by adsorption and propagation of intraoral bacteria such as Streptococcus mutans and the like on the surfaces of teeth. It is well known that dental plaque is the cause of dental caries and is also the cause of gingivatis or alveolar pyorrhea. Therefore, it is important to remove dental plaque and to prevent adhesion of it (plaque control) for oral sanitation.

Among the plaque control methods, the method which is conducted most popularly is that for removing dental plaque mechanically by brushing, that is, by using a toothbrush. However, in order to remove dental plaque completely by brushing, high-level brushing technique is needed. In practice, almost all of peoples are conducting insufficient brushing and therefore, the rate of diseases such as dental caries, gingivatis and alveolar pyorrhea is not reduced despite of conducting brushing.

Accordingly, in order to compensate brushing, or to substitute for brushing, a chemical plaque control method has been studied. The pyridinium compounds having C8-18 straight or blanched chain alkyl group are famous. Among them, the compound of which efficacy and safety are clinically admitted is cetylpyridinium chloride.

It is known that cetylpyridinium chloride is a compound represented by the formula:

and it has a bactericidal action and is relatively liable to be adsorbed to oral mucosa or the surfaces of teeth. Thereby, it is considered that adsorption of intraoral bacteria to the surfaces of teeth is prevented and, further, formation of dental plaque is prevented. However, a study on promoting adsorption of such cetylpyridinium chloride to the surfaces of teeth and improving it's effect has not been found yet.

The present inventors have intensively studied to promote remaining of cetylpyridinium chloride in the oral cavity, particularly adsorption of it to the surfaces of teeth and to enhance the effect for preventing formation of bacterial plaque. As a result, it has been found that, when cetylpyridinium chloride is used in combination with a N°-longer acyl basic amino acid lower alkyl ester or a salt thereof, adsorption of cetylpyridinium chloride to the surfaces of teeth is extremely promoted. Thus, the present invention has 40 < been completed.

# DISCLOSURE OF THE INVENTION

According to the present invention, there is provided an oral composition comprising cetylpyridinium chloride and a Nª-longer acyl basic amino acid lower alkyl ester or a salt thereof. According to the present invention, an oral composition which promotes adsorption of cetylpyridinium chloride to the surfaces of teeth and has excellent effect for preventing formation of dental plaque and dental caries can be obtained.

Çetylpyridinium chloride is normally formulated into the composition in an amount of more than 0.002 % by weight, preferably more than 0.01 % by weight. In view of bactericidal effect, the upper limit of the amount of cetylpyridinium chloride is not specifically limited. Considering the fact that cetylpyridinium chloride has a bitter taste and is likely to color teeth when the amount is too large, or influence on oral mucosa and the like, it is normally preferred that the amount is less than 1 % by weight.

As the basic amino acid part of the N°-longer acyl basic amino acid lower alkyl ester to be used, ornithine, lysine and arginine are particularly preferred and it may be either an optical isomer or laceme thereof. The acyl group thereof is a saturated or unsaturated natural or synthetic fatty acid residue having 8 to 22 carbon atoms, for example, it may be a natural system mixed fatty acid residue such as coconut oil

Table 1

	Compound	Amount of cetylpyridinium chloride (µg/disc)	
5		Initial	After 3 hours
	0.05 % Cetylpyridinium chloride	170	63
	0.05 % Cetylpyridinium chloride + 0.01 %	411	321
0	N°-cocoyl-L-arginine methyl ester hydrochloride 0.05 % Cetylpyridinium chloride + 0.1 %	436	336
	N°-lauroyl-L-arginine methyl ester pyrrolidone carboxylate 0.05 % Cetylpyridinium chloride + 0.1 %	438	346
5	N°-cocoyl-L-arginine ethyl ester pyrrolidone carboxylate 0.05 % Cetylpyridinium chloride + 0.1 %	424	330
5	N°-palmitol-L-lysine methyl ester acetate 0.05 % Cetylpyridinium chloride + 0.1 % sodium	59	18
	N°-lauroyl methyl taurine 0.05 % Cetylpyridinium chloride + 0.1 % sodium	173	60
o	N°-lauroyl-methyl-b-alanine 0.05 % Cetylpyridinium chloride + 0.005 %	175	119
	Nº-cocoyl-L-arginine ester pyrrolidone carboxylate 0.05 % Cetylpyridinium chloride + 0.01 %	331	242
	N°-cocoyl-L-arginine ethyl ester pyrrolidone carboxylate 0.05 % Cetylpyridinium chloride + 0.05 %	392	294
25	N°-cocoyl-L-arginine ethyl ester pyrrolidone carboxylate		l

As is shown in Table 1, when a N°-longer acyl basic amino acid lower alkyl ester is formulated, cetylpyridinium chloride is specifically adsorbed to the hydroxyapatite disc and it is necessary that the weight ratio is more than 1/5 based on the weight of cetylpyridinium chloride.

#### Experiment 2

Since cetylpyridinium chloride is sometimes inactivated in the case of forming a salt with an acidic substance, retention of bactericidal activity was also tested as follows.

Regarding a sample wherein adsorption of cetylpyridinium chloride to the hydroxyapatite disc was enhanced by adding the N°-longer acyl basic amino acid lower alkyl ester, a disc was suspended to a 5 % sucrose BHI medium. Then, one loopful of the Streptococcus mutans ATCC 25175 strain was inoculated and cultivated at 37 °C for 18 hours. As a result, adhesion of plaque to the hydroxyapatite disc was not observed and it was confirmed that cetylpyridinium chloride adsorbed on the hydroxyapatite disc retains bactericidal activity.

#### Example 1

According to the following formulation, a toothpaste was prepared by degassing, kneading and stirring according to a conventional method.

	, ,	Ingredients	% by weight
50	· :	Calcium hydrogenphosphate Polyoxyethylene polyoxypropylene glycol Glycerin	20.0 30.0 10.0
55		Cetylpyridinium chloride  N°-lauroyl-L-arginine methyl ester pyrrolidone carboxylate  Saccharin sodium  Flavor	0.1 0.05 0.2 1.0
*		Distilled water	up to 100 %

#### EP 0 485 616 A1

fatty acid, tallow fatty acid residue and the like, in addition to a monofatty acid residue such as lauroyl, myristyl, stearoyl group and the like. Further, it may also be a lower alkyl ester, and methyl ester, ethyl ester and propyl ester are suitable.

Examples of the salt of such the N°-longer basic amino acid lower alkyl ester include an inorganic acid salt such as hydrochloride, sulfate, etc. or an organic acid salt such as acetate, tartrate, citrate, p-toluenesulfonate, fatty acid salt, acidic amino acid salt, etc. Among them, glutamate, pyroglutamate, acetate and citrate are preferred.

In the present invention, the N°-longer basic amino acid lower alkyl ester or a salt thereof is that which promotes adsorption of cetylpyridinium chloride to the surfaces of teeth. The weight ratio thereof is at least 1/5, normally 1/5 to 10 based on the weight of cetylpyridinium chloride. When the ratio is too small, an effect for promoting adsorption of cetylpyridinium chloride to teeth becomes insufficient.

The oral composition of the present invention can be prepared in the form of tooth powder, dentifrice, mouthwash, troches and the like by formulating desired ingredients according to a conventional method and, further, it can be sprayed in the oral cavity as an aerosol. Further, it can be used for a liniment and also used after it was impregnated in a dental floss or toothpick.

The other ingredients formulated may be any ingredients which can be used in this kind of compositions in so far as they do not inhibit adsorption of cetylpyridinium chloride to the surfaces of teeth and it's bactericidal action. In the case of using vesicants or solubilizers, anionic ingredients are not preferred. It has been found that, when using nonionic or cationic ingredients, particularly, polyoxyethylene polyoxypropylene glycol, ethylenediaminetetrapolyoxyethylene polyoxypropylene glycol and the like, the effect of cetylpyridinium chloride is further improved.

#### **EXAMPLES**

The following Experiments and Examples further illustrate the present invention in detail but are not to be construed to limit the scope thereof. In Experiments and Examples, all percentages are by weight unless otherwise stated.

#### Experiment 1

30

25

Adsorption test of cetylpyridinium chloride to the surfaces of teeth

The composition of enamel of the surfaces of teeth consists of inorganic mineral (97 %), organic material (1%) and water content (2 %), and a main ingredient of the mineral is calcium phosphate which is referred to as hydroxyapatite  $[Ca_{10}(PO_4)_6(OH)_2]$ .

As a model of enamel of teeth, that obtained by dipping a hydroxyapatite disc [Bio-Gel HTP manufactured by Bio. Rad. Laboratories Co., U.S.A., 13 mm\$\phi\$ x 250 mg; prepared by making tablets at 150 kg/cm² and sintering at 600 °C for 6 hours] in human saliva at 37 °C for 18 hours was used. By dipping in saliva, saliva mucoprotein, etc. was adsorbed to the surface of hydroxyapatite to be allowed to simulate an actual state of tooth enamel wetted with saliva. This hydroxyapatite disc treated with saliva was placed in a test tube, followed by the addition of an aqueous 0.05 % cetylpyridinium chloride (manufactured by Merck Co.) solution (1 ml) and shaking at 37 °C for 30 minutes. Thereafter, it was washed with water (6 ml) and extracted with an extraction solvent [50 mM sodium lauryl sulfate, 40 mM citrate buffer (pH 3.0)/acetonitrile = 30/70] to form a sample for high speed liquid chromatography. In the case of high speed liquid chromatography, Lichrosorb RP select B (4.0 mm\$\phi\$ x 250 mm) was used as a separation column and a extraction solvent was used as an eluent. The flow rate was 1 ml/minutes and detection of cetylpyridinium was conducted by measuring absorbance with 258 nm. Further, by using a calibration curve made by a standard solution of cetylpyridinium chloride, the amount of cetylpyridinium chloride was determined.

Likewise, after an apatite disc treated with saliva was dipped in a mixed solution in which various additives as shown in Table 1 were added to 0.05 % cetylpyridinium chloride in an amount of 0.1 %, respectively, the amount of cetylpyridinium chloride was determined. Further, regarding N°-cocoyl-Larginine ethyl ester pyrrolidone carboxylate among the additives which showed the effect for enhancing the amount of cetylpyridinium chloride adsorbed on the apatite disc, by varying in amount between 0.005, 0.01 and 0.05 %, respectively, the influence of the concentration on the amount of cetylpyridinium chloride adsorbed was confirmed. The results are also shown in Table 1.

#### Example 2

5

10

15

20

25

30

35

45

According to the following formulation, a toothpaste was prepared by degassing, kneading and stirring according to a conventional method.

Ingredients	% by weight
Calcium carbonate	35.0
Hydroxyethylcellulose	1.5
Ethylenediamine tetrapolyoxyethylene polyoxypropylene glycol	5.0
Sorbitol	30.0
Cetylpyridinium chloride	0.01
N°-cocoyl-L-arginine methyl ester hydrochloride	0.01
Saccharin sodium	0.1
Flavor	1.0
Distilled water	up to 100 %

#### Example 3

According to the following formulation, a liquid mouthwash was prepared by mixing with stirring according to a conventional method.

Ingredients	% by weight
Ethanol	10.0
Glycerin	10.0
Polyoxyethylene polyoxypropylene glycol	1.5
Saccharin sodium	0.02
Cetylpyridinium chloride	0.05
N°-cocoyl-L-arginine ethyl ester pyrrolidone carboxylate	.0.1
Flavor	0.3
Distilled water	up to 100 %

#### Example 4

A yarn of 630 deniers comprising a plural of fine denier filaments of 6,6-nylon being twisted was dipped in the mixed solution of the following formulation, passed through a drying tube at 50 °C and spooled with vaporizing ethanol to produce a dental floss.

Ingredients	% by weight
Cetylpyridinium chloride	5.0
N°-cocoyl-L-arginine ethyl ester pyrrolidone carboxylate	10.0
Ethanol	85.0

#### Claims

 An oral composition comprising cetylpyridinium chloride and a N°-longer acyl basic amino acid lower alkyl ester or a salt thereof.

# INTERNATIONAL SEARCH REPORT

International Application No PCT/JP91/00691

According to Informational Patient Classification (IPC) or to both National Classification and IPC  Int. C1 A61K7/22  III. FIELDS BEARCHID  Minimum Documentation Searched  Minimum Documentation Symbols  IPC A61K7/22  Decumentation System:  Classification System:  Classification System:  Classification System:  Classification System:  Document on the Estant that such Documents are Included in the Fields Searched:  III. Document Considerably To BR RELEVANY:  Category:  Classification of Document, I' with indication, where appropriate, at the relevant beassages:  A JF, A, 48-1140 (Ajinomoto Co., Inc.),  January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.),  July 29, 1978 (29. 07. 78)  A JP, A, 13-86047 (Colgate-Palmolive Co.),  July 29, 1978 (29. 07. 78)  The consideration of the process of the search	I. CLAS	SIFICATION OF BUBJECT MATTER (If several cl	BESTOCATION SYMPOLE AND IN INC.	-,,
INT. CLID A61K7/22  II. PRELOS BEARCHED  Minimum Documentation Searched  IPC A61K7/22  Decumentation Searched other than Minimum Documentation to the Estant that such Documents are included in the Paints Searched.  III. DOCUMENTS CONSIDERED TO BE RELEVANT:  Category* Citation of Document.* with indication, where appropriate, of the relevant peasages "Relevant to Claim No. "I JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The safete document but plusted on or after the intermetional claim of the intermetion of the international Search Application of August 19, 1991 (19. 08. 91)  Delice of Markhouse Officer  Intermetical Search August 19, 1991 (19. 08. 91)	Accordin	ng to International Patent Classification (IPC) or to both	National Classification and IRC	
Classification System   Casaffication Symbols	Int	t. Cl <sup>5</sup> A61K7/22	·	
TPC A61K7/22  Decumentation Searched other than Minimum Documentation to the Estent that such Documents are included in the Fields Searched!  III. DOCUMENTS COMSIDERED TO BE RELEVANT:  Category* Citation of Document.** with indication, where appropriate, of the relevant peasages ** Reterent to Claim No. 1*  A JF, A, 48-1140 (Ajinomoto Co., Inc.),     January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.),     July 29, 1978 (29. 07. 78)  A JP, A 53-86047 (Colgate-Palmolive Co.),     July 29, 1978 (29. 07. 78)  **Concerned defining age generated on the art which is not considered to be of personned in the policy of the considered on the personned on the personned on the personned of the personned on the personned	II. PIELD	DE BEARCHED		
III. DOCUMENTS CONSIDERED TO BE RELEVANT:  Decumentation Searched other Inten Minimum Documentation to the Estent that such Documents are Included in the Fields Searched!  III. DOCUMENTS CONSIDERED TO BE RELEVANT:  Category* Cliston of Decument, III with indication, where appropriate, of the relevant peasages II. Reterent to Claim No. II.  A JP, A, 48-1140 (Ajinomoto Co., Inc.),     January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.),     July 29, 1978 (29. 07. 78)  A JP, A, 53-86047 (Colgate-Palmolive Co.),     July 29, 1978 (29. 07. 78)  **Concleted of high piece and production of the private of the conclete of the production of the private of the pri		Minimum Docu	mentation Searcheg *	
Documentation Searched other Ihan Minimum Documentation to the Estent Ihal auch Documents are Included in the Flaids Searched 1  III. BOCUMENTS CONSIDERED TO BE RELEVANT *  Category * Citetion of Decument, " with Indication, where appropriate, of the relevant passages " Relevant to Claim No. "  A JP, A, 48-1140 (A) innomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The safety document defining the general state of the art which is not considered to be of particular relevance. The claim of the constitution of the consti	Cleasificat	tion System :	Classification Symbols	
Decumentation Searched other than Minimum Documentation to the Estent that such Documents are Included in the Fairlds Searched   **  **  **  **  **  **  **  **  **				
III. DOCUMENTS CONSIDERED TO BE RELEVANT.  Category** Citetion of Decument, "with indication, where appropriate, of the relevant passages."  A JP, A, 48-1140 (A)innomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The comment defining the general state of the art which is not a comment of the process	IF	PC A61K7/22		
Category* Citation of Document, " with Indication, where appropriate of the relevant peasages " Relevant to Claim No. "  JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The second categories of citad documents: "  "A" document defining the general state of the art which is not considered to be of particular relevance or considered to be of particular relevance or which are citation or other space at reason dis appointment of the property of the complete of the co		Documentation Searched oth to the Extent that such Docume	er than Minimum Documentation into are included in the Fields Searched	
Category* Citation of Document, "with Indication, where appropriate of the relevant passages."  A JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The second categories of cited documents: "  "A" document defining the general state of the art which is not considered to be of particular relevance or considered to be of particular relevance."  Espaire document but published on or after the international inling date and not in conflict with the application cannot or which a cited to establish the published on or after the international relevance or which a cited to establish the published on a conflict with the published or which may throw the published on the original or which a cited to establish the published on a conflict with the special reason (as appeared to involve an inventive size or which a cited to establish the published on a comment of particular relevance; the claimed invention cannot obscured a provide an inventive size or when the document of particular relevance is the claimed invention cannot obscured to involve an inventive size or when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size or when the document of particular relevance; the claimed invention cannot obscured a provide an inventive size or when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size or when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size or when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size when the document of particular relevance; the claimed invention cannot be considered to involve an inventive size when the document of particular relevance; the claimed invention cannot be consi				
Category* Citation of Document, " with Indication, where appropriate of the relevant peasages " Relevant to Claim No. "  JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The second categories of citad documents: "  "A" document defining the general state of the art which is not considered to be of particular relevance or considered to be of particular relevance or which are citation or other space at reason dis appointment of the property of the complete of the co		•		r.
Category* Citation of Document, " with Indication, where appropriate of the relevant peasages " Relevant to Claim No. "  JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  The second categories of citad documents: "  "A" document defining the general state of the art which is not considered to be of particular relevance or considered to be of particular relevance or which are citation or other space at reason dis appointment of the property of the complete of the co	III. DOCL	IMENTS CONSIDERED TO BE RELEVANT		
JP, A, 48-1140 (Ajinomoto Co., Inc.), January 9, 1973 (09. 01. 73)  A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  T later document published after the international filing data or phontly date and not in conflict with the application but clear to considered to be of particular relevance  E safeter document but published on or after the international filing data or which as clear to extend the principle or theory understand to involve an inventive step of control or active document of particular relevance; the claimed invention cannot be considered to involve as in inventive step of control or control or active document of particular relevance; the claimed invention cannot be considered to involve as in inventive step of control or active document of particular relevance; the claimed invention cannot be considered to involve as in inventive step of control or active ac			appropriate, of the relevant passance 12	Relevant to Claim Man 15
A JP, A, 53-86047 (Colgate-Palmolive Co.), July 29, 1978 (29. 07. 78)  *Social categories of cited documents. 10  A document defining the general state of the art which is not considered to be of particular relevance.  E included the column of the column of the cited to establish the publication of cited to column of the resource of	A	JP, A, 48-1140 (Aiinomo	to Co. Inc.	1 HOLEN NO. 13
*Special categories of cited documents: **  *Special categories of cited documents: **  *Special categories of cited documents: **  *A document defining the general state of the art which is not considered to be of particular relevance.  *E sprier document but published on or after the international filling date or which is cited to establish the published on or after the international filling date or which is cited to establish the publication date of another which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of another or which is cited to establish the publication date of the deciment of the presence and the published of the deciment of the same patent family user than the promity date claimed  **Comment of pericular relevance: the claimed invention cannot or their means and specified or considered to invention eating of the commentume state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when it is combined with one or an exercise state when it is combined with one or an exercise state when it is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state when the document is combined with one or an exercise state whe		January 9, 1973 (09. 01	. 73)	•
*Special categories of cited documents: **  *To accument defining the general state of the art which is not considered to be of particular relevance or after the international filling date or priority date and not in conflict with the application but cited to priority date and not in conflict with the application but cited to priority date and not in conflict with the application but cited to priority date and not in conflict with the application but cited to understand the principle or theory undestring the invention cannot be considered or cannot be considered to involve an invention cannot be considered to involve an invention cannot other special reason (as specified)  **Cocument referring to an oral disclosure, use exhibition or other means  **Cocument published prior to the international filing date out of the considered to involve an inventive step when the documents accombined with one or more other such documents as uch concumination being devices to a person actiled in the art discount member of the same patient family  **CERTIFICATION**  **Date of Matting of this international Search Report August 5, 1991 (05. 08. 91)  **International Searching Authority**  **Signature of Authorized Officer**	:	,		•
*Social categories of cited documents: 19  "A" document defining the general state of the art which is not considered to be of particular relevance or considered to involve an invention cannot be considered to involve an invention cannot be considered to involve an invention cannot other special reason (as specified) or which is cited to establish the publication cate of another citation or other special reason (as specified).  "C" document which may throw doubts on prorthy claimfel or which is cited to establish the publication cate of another citation or other special reason (as specified).  "C" document relevance to establish the publication cate of another citation or other special reason (as specified).  "C" document which may throw doubts on prorthy claimfel or which is cited to establish the publication cate of another citation or other special reason (as specified).  "C" document which may throw doubts on prorthy claimfel or which is cited to establish the publication cate of another citation or other special reason (as specified).  "C" document which may throw doubts on prorthy claimfel or which is cited to establish the publication cate of another citation or other special reason (as specified).  "C" document which may throw doubts on prorthy claimfel or which is cited to establish the publication cate of another citation or other special provides of another citation or other special provides or other special the protection of the categorial provides or one of other special to involve an inventive association of comments as the considered to involve an inventive as of comments of particular relevance: the claimed formation cannot be considered to involve an inventive as of comments of comments as of comments and the principle of cannot be considered to involve an inventive as of commen	A	JP, A, 53-86047 (Colgate	-Palmolive Co.)	
*Special categories of cited documents: 10  *A" document defining the general state of the art which is not considered to be of particular relevance  "E" sariar document but published on or after the international filling date or understand the principle or theory understand the principle or the		July 29, 1978 (29. 07.	78)	•
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family  "A" ducument member of the same patent family  "August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	j			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family  "A" ducument member of the same patent family  "August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	1			1
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	į			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	j			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	į	,		
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other apecial reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family.  "A ugust 19, 1991 (19, 08, 91)  Signature of Authorized Officer				
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	!			! 
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent				
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	i			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family  "A" ducument member of the same patent family  "August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	i			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	!			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	į			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	i i		·	
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent	:			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date. "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified). "O" document referring to an oral disclosure, use, exhibition or other means. "P" document published prior to the international filling date but later than the principle or theory underlying the invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" decument member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discriment member of the same patent family.  "A" discriment of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an inventive are provided in the set of the considered to involve an invent				
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family  "A" ducument member of the same patent family  "August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	Ì			
"Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document published prior to the international filling date but later than the priority date claimed  "A" document relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art discument member of the same patent family  "A" ducument member of the same patent family  "August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	_			
"A" document defining the general state of the art which is not considered to be of particular relevance."  "E" earlier document but published on or after the international filling date.  "L" document which may throw doubts on priority claim(s) or which is cried to establish the publication date of another citation or other special reason (as specified).  "O" document referring to an oral disclosure, use, exhibition or other means."  "P" document published prior to the international filling date but later than the priority date and not in conflict with the application but clad to understand the principle or theory underlying the invention.  "C" document which may throw doubts on priority claim(s) or which is cried to establish the publication date of another citation or other special reason (as specified).  "O" document referring to an oral disclosure, use, exhibition or other means."  "P" document published prior to the international filling date but later than the priority date and not in conflict with the application but clad to understand the principle or theory underlying the invention.  "A comment of particular relevance: the claimed invention cannot be considered novel or cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such document is combination being obvious to a person skilled in the art discount of the same patent family.  V. CERTIFICATION  Date of Mailing of this international Search Report August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)				ļ
considered to be of particular relevance  "E" earlier document but published on or after the international filling date  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason les specified?  "O" document referring to an oral disclosure, use, exhibition or other means  "O" document published prior to the international filling date but later than the priority date claimed  "V. CERTIFICATION  Date of the Actual Completion of the International Search  August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)	* Special c	ategories of cited documents: 10		international filling date or
"E" agriser document but published on or after the international filling date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but lear than the priority date claimed  "V. CERTIFICATION  Date of the Actual Completion of the International Search August 5, 1991 (05, 08, 91)  August 19, 1991 (19, 08, 91)  Signature of Authorized Officer	consi	dered to be of particular relevance	priority date and not in conflict with	the confication but clied to I
which is cited to establish the publication date of another citation or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means  "P" document published prior to the international filing date but later than the priority date claimed  V. CERTIFICATION  Date of Mailing of this international Search August 5, 1991 (05, 08, 91)  August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)  August 19, 1991 (19, 08, 91)	"E" eartie filing	r document but published on or after the international date.	"X" document of particular relevance; the be considered novel or cannot be	Claimed invention cannot
"O" document referring to an oral disclosure, use, exhibition or other means combination being obvious to a person skilled in the art discument published prior to the international filing date out later than the priority date claimed  V. CERTIFICATION  Date of Mailing of this international Search Report August 5, 1991 (05, 08, 91)  August 19, 1991 (19, 08, 91)  International Searching Authority  Signature of Authorized Officer	which	"Y" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of senter. "Y" document of particular relevance: the claimed invention capacity.		e claimed invention cannot
other means of the	"O" docum	nent referring to an oral disclosure, use, exhibition or	is complised with one of more offi-	of Buch documents such !
V. CERTIFICATION  Date of the Actual Completion of the International Search August 5, 1991 (05. 08. 91)  Date of Mailing of this International Search Report August 19, 1991 (19. 08. 91)  International Searching Authority  Signature of Authorized Officer	O(THE)	means ·	communition paind dovious to a bell	ion skilled in the art
August 5, 1991 (05. 08. 91)  Date of Mailing of this International Search Report  August 19, 1991 (19. 08. 91)  International Searching Authority  Signature of Authorized Officer	ister t	han the priority date claimed	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
August 5, 1991 (05. 08. 91) August 19, 1991 (19. 08. 91)  International Searching Authority Signature of Authorized Officer	V. CERTIF	CATION	1	<del></del>
August 5, 1991 (05. 08. 91) August 19, 1991 (19. 08. 91)  Iternational Searching Authority Signature of Authorized Officer	ate of the	Actual Completion of the International Search	Date of Mailing of this International Sear	ch Report
Signature of Administra Officer	Augu	st 5, 1991 (05. 08. 91)		1
1	ternational	Searching Authority	Signature of Authorized Officer	
	Japan	nese Patent Office		